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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,686	08/07/2006	Katsuyuki Tsuchida	4700.P0335US	9917
23474 7590 04/07/2010 FLYNN THIEL BOUTELL & TANIS, P.C. 2026 RAMBLING ROAD KALAMAZOO, MI 49008-1631				
EXAMINER WONG, EDNA				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
04/07/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/588,686

Applicant(s)

TSUCHIDA ET AL.

Examiner

EDNA WONG

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/CD)
Paper No(s)/Mail Date See Continuation Sheet
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :August 7, 2006; November 13, 2007; January 23, 2009; and August 10, 2009.

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Applicants' specification discloses that Fig. 1 is a simplified diagram of a conventional apparatus for producing a copper foil (page 2, [0004]).

Specification

The disclosure is objected to because of the following informalities:

page 16, line 13, it is unclear what is meant by "o 65°C".

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the

specification.

Claim Objections

Claim 1 is objected to because of the following informalities:

Claim 1

line 9, it is suggested that the word -- of -- be inserted after the word "integer".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

I. Claims 4 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4

lines 2-3, recite "wherein said copper electrolytic solution contains an organic sulfur compound".

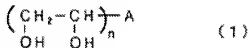
We already know what the copper electrolytic solution contains from claim 1, lines 1-2. Thus, it is unclear from the claim language how claim 4 is further limiting the copper electrolytic solution. It is suggested that the word -- further -- be inserted after the word "solution".

II. Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the copper in the copper electrolyte solution.

Claim 1

lines 1-10, recite:

A copper electrolytic solution containing as an additive a compound having a specific skeleton represented by formula (1) below, which is obtained by an addition reaction in which water is added to a compound having in a molecule at least one epoxy group:



wherein A is an epoxy compound residue and n is an integer 1 or more.

The copper electrolytic solution as presently claimed does not contain any copper.

Claim 5

lines 13-16, recite "X is selected from the group consisting of hydrogen, a sulfonic acid group, a phosphonic acid **and** an alkali metal salt group **or** ammonium salt group of sulfonic acid or phosphonic acid".

The alternative expression of the Markush group is improper (MPEP § 2173.05(h)).

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

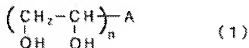
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

I. Claims **1-4** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Rockett** (US Patent No. 3,264,216).

Rockett teaches a copper electrolytic solution containing:

• as an additive a compound having a specific skeleton represented by formula

(1) below, which is obtained by an addition reaction in which water is added to a compound having in a molecule at least one epoxy group:

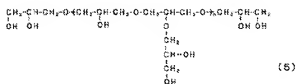
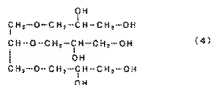
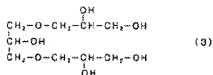
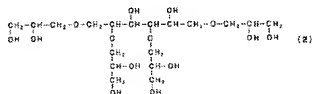


wherein A is an epoxy compound residue and n is an integer 1 or more (= CH₂=CH-CH₂-O-CH₂-CHOH-CH₂OH) [col. 2, line 20].

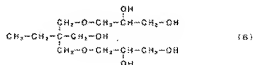
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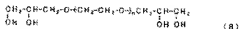
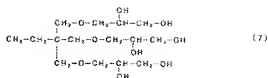
The epoxy compound residue A of said compound having the specific skeleton has a linear ether bond ($=\text{CH}_2=\text{CH}-\text{CH}_2-\text{O}-\text{CH}_2-\text{CHOH}-\text{CH}_2\text{OH}$) [col. 2, line 20].

The compound having a specific skeleton ***includes*** any of compounds represented by formulae (2) through (9) below:

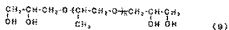


wherein n is an integer of 1 to 5.





wherein n is an integer of 1 to 22 and



wherein n is an integer of 1 to 3 (= the transitional term "comprising", which is synonymous with "including", "containing", or "characterized by", is inclusive or open-ended and does not excludes additional, unrecited elements or methods steps) [MPEP § 2111.03].

The copper electrolytic solution contains an organic sulfur compound (= an alkylated phenol sulfide) [col. 4, lines 24-34].

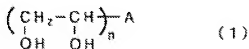
II. Claims 1-4 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Sawyer et al.** ("Interaction of Anionic Detergents and Certain Polar Aliphatic Compounds in Foams and Micelles", *J. Phys. Chem.* (1958), Vol. 62, No. 2, pp. 159-166).

Sawyer teaches a copper electrolytic solution containing:

- as an additive a compound having a specific skeleton represented by formula

(1) below, which is obtained by an addition reaction in which water is added to a

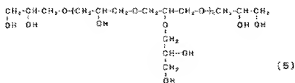
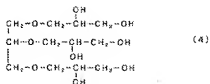
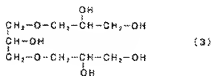
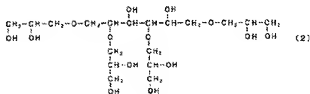
compound having in a molecule at least one epoxy group:



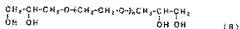
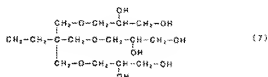
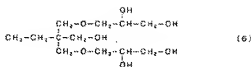
wherein A is an epoxy compound residue and n is an integer 1 or more (= the glycerol ethers) [page 162, Table II, "Compound"].

The epoxy compound residue A of said compound having the specific skeleton has a linear ether bond (= the glycerol ethers) [page 162, Table II, "Compound"].

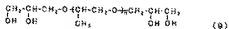
The compound having a specific skeleton **includes** any of compounds represented by formulae (2) through (9) below:



wherein n is an integer of 1 to 5.



wherein n is an integer of 1 to 22 and



wherein n is an integer of 1 to 3 (= the transitional term "comprising", which is synonymous with "including", "containing", or "characterized by", is inclusive or open-ended and does not excludes additional, unrecited elements or methods steps) [MPEP § 2111.03].

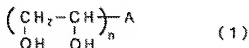
The copper electrolytic solution contains an organic sulfur compound (= DDS, SAS and PTBS) [page 162, Table II].

III. Claims **1** and **3** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **De Almeida et al.** ("Voltammetric and Morphological Characterization of Copper Electrodeposition from Non-Cyanide Electrolyte", *J. of Appl. Electrochem.* (2002), Vol. 32, pp. 763-773).

De Almeida teaches a copper electrolytic solution containing:

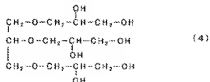
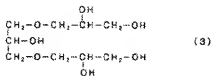
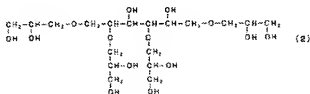
- as an additive a compound having a specific skeleton represented by formula

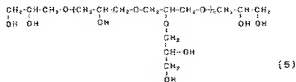
(1) below, which is obtained by an addition reaction in which water is added to a compound having in a molecule at least one epoxy group:



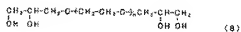
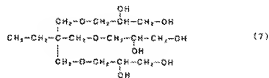
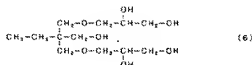
wherein A is an epoxy compound residue and n is an integer 1 or more (= glycerol)
 [page 763, "2. Experimental details"].

The compound having a specific skeleton includes any of compounds represented by formulae (2) through (9) below:

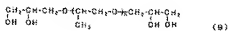




wherein n is an integer of 1 to 5.



wherein n is an integer of 1 to 22 and



wherein n is an integer of 1 to 3 (= the transitional term "comprising", which is synonymous with "including", "containing", or "characterized by", is inclusive or open-ended and does not excludes additional, unrecited elements or methods steps) [MPEP § 2111.03].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

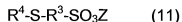
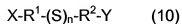
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **4** and **5** are rejected under 35 U.S.C. 103(a) as being unpatentable over **De Almeida et al.** ("Voltammetric and Morphological Characterization of Copper Electrodeposition from Non-Cyanide Electrolyte", *J. of Appl. Electrochem.* (2002), Vol. 32, pp. 763-773) as applied to claims 1 and 3 above, and further in view of **Watson** (US Patent No. 4,376,685).

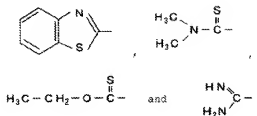
De Almeida is as applied above and incorporated herein.

The solution of De Almeida differs from the instant invention because De Almeida does not disclose the following:

- a. Wherein said copper electrolytic solution contains an organic sulfur compound, as recited in claim **4**.
- b. Wherein said organic sulfur compound is a compound represented by formula (10) or (11) below:

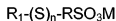


wherein in formulae (10) and (11), R^1 , R^2 and R^3 are alkylene groups with 1 through 8 carbon atoms, R^4 is selected from the group consisting of hydrogen,



X is selected from the group consisting of hydrogen, a sulfonic acid group, a phosphonic acid group and an alkali metal salt group or ammonium salt group of sulfonic acid or phosphonic acid, Y is selected from the group consisting of a sulfonic acid group, a phosphonic acid group and an alkali metal salt group of sulfonic acid or phosphonic acid, Z is hydrogen or an alkali metal, and n is 2 or 3, as recited in claim 5.

Like De Almeida, **Watson** teaches copper electrodeposition. Watson teaches organic sulfur compounds represented by the formula:



wherein M is an alkali metal or ammonium ion; n is from 1 to 6; R is an alkylene group of from 1 to 8 carbon atoms, a divalent aromatic hydrocarbon or an aliphatic-aromatic hydrocarbon containing 6 to 12 carbon atoms; R_1 is a group represented by the formula MO_3SR , wherein M & R are as described above; and



wherein R_2 & R_3 are each hydrogen or an alkyl group having from 1 to 4 carbon atoms (col. 3, line 58 to col. 4, line 47). The sulfur compounds are additives which provide bright and leveled copper electrodeposits (col. 1, lines 8-14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solution described by De Almeida with (a) and (b) above because organic sulfur compounds represented by the formula: $R_1-(S)_n-OSO_3M$ would have provided bright and leveled copper electrodeposits as taught by Watson (col. 1, lines 8-14; and col. 3, line 58 to col. 4, line 29).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1795

EW
April 5, 2010